IE-MultiWay

Operation Manual

FCC Radio Frequency Interference Statement

Class A (using 48V Telco type power)

This equipment has been tested and found to comply with the limits for a Class A computing device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The use of non-shielded I/O cables may not guarantee compliance with FCC RFI limits. This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

Class B (using all other power options)

This equipment has been tested and found to comply with the limits for a Class B computing device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The use of non-shielded I/O cables may not guarantee compliance with FCC RFI limits. This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

Warranty

IMC Networks warrants to the original end-user purchaser that this product, EXCLUSIVE OF SOFTWARE, shall be free from defects in materials and workmanship under normal and proper use in accordance with IMC Networks' instructions and directions for a period of six (6) years after the original date of purchase. This warranty is subject to the limitations set forth below.

At its option, IMC Networks will repair or replace at no charge the product which proves to be defective within such warranty period. This limited warranty shall not apply if the IMC Networks product has been damaged by unreasonable use, accident, negligence, service or modification by anyone other than an authorized IMC Networks Service Technician or by any other causes unrelated to defective materials or workmanship. Any replaced or repaired products or parts carry a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

To receive in-warranty service, the defective product must be received at IMC Networks no later than the end of the warranty period. The product must be accompanied by proof of purchase, satisfactory to IMC Networks, denoting product serial number and purchase date, a written description of the defect and a Return Merchandise Authorization (RMA) number issued by IMC Networks. No products will be accepted by IMC Networks which do not have an RMA number. For an RMA number, contact IMC Networks at PHONE: (800) 624-1070 (in the U.S and Canada) or (949) 465-3000 or FAX: (949) 465-3020. The end-user shall return the defective product to IMC Networks, freight, customs and handling charges prepaid. End-user agrees to accept all liability for loss of or damages to the returned product during shipment. IMC Networks shall repair or replace the returned product, at its option, and return the repaired or new product to the end-user, freight prepaid, via method to be determined by IMC Networks. IMC Networks shall not be liable for any costs of procurement of substitute goods, loss of profits, or any incidental, consequential, and/or special damages of any kind resulting from a breach of any applicable express or implied warranty, breach of any obligation arising from breach of warranty, or otherwise with respect to the manufacture and sale of any IMC Networks product, whether or not IMC Networks has been advised of the possibility of such loss or damage.

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About the IE-MultiWay

The IE-MultiWay is a standalone device providing two 10/100/1000Base-T copper ports and 2 SFP ports. The SFP ports support fiber or copper SFPs. As a plug and play device, the IE-MultiWay provides several distinct modes of operation to support a wide range of applications. The IE-MultiWay provides OAM functionality, 802.3ah is supported on each uplink. It also supports jumbo frame sizes of up to 10,240 bytes as well as AutoCross for the copper ports. Power options for the IE-MultiWay include both a standard low voltage wall transformer and a Power Block for Office Battery connection. As an Industrial Ethernet device, it supports an extended temperature range of -40C to +85C. A console port and a DIP Switch bay provide configuration options.

The IE-MultiWay requires two small form-factor (SFP) modules which provide greater fiber flexibility in the network environment. The hot-swappable nature of the SFPs and the numerous fiber modes and types available in SFPs allow for easy configuration and future upgrading as network demands evolve. The SFP modules must be MSA-compliant and support the same speed range.

SFPs are sold separately and meet Class 1 Laser Safety Standard.

Installing the IE-MultiWay

The IE-MultiWay is a standalone, table-top device with a small form factor making it ideal for installation in locations with limited space, or it can be DIN rail mounted. DIN rail clips are available for purchase through IMC Networks (Part Number 806-39105).

Powering the IE-MultiWay

The IE-MultiWay includes multiple powering options:

- AC adapter
- The 4-terminal DC power block
- An optional IE-Power/5V DIN rail mount power supply, extended temperature
- An optional IMC Networks Double-USB Power Cable (available only from IMC Networks)

IE-MultiWay with optional DIN rail mount power supply

SFP Ports

The IE-MultiWay SFP ports support gigabit fiber SFPs, 100Mbps fiber SFPs, with or without Digital Diagnostics Monitory Interface (DDMI) as well as copper SFPs ports available in 10/100/1000Mbps. DDMI statistics provide real-time access to transceiver operating parameters such as voltage, temperature, laser bias current, and both transmitted and received optical power. This information can be accessed through the management system. The SFPs must be MSA-compliant, and can be from IMC Networks or other suppliers.

Configuration Instructions

The IE-MultiWay can be configured in one of the following ways:

Configuration Method	Description
4-Port Switch (default)	In this mode, the unit acts as a standard 4-port MAC-layer switch. In this configuration, IEEE802.3ah Passive is enabled on both fiber ports, and can be enabled on the RJ-45 ports through the CLI.
Dual Converter mode	In this configuration, the unit functions as two independent (SFP to TX) media converters and traffic never passes between the two converters.
1+1 SFP Protection Non-Revertive mode	In this mode, the "SFP A" port (fiber or copper) is connected through the switch to the drop ports as the main link. The "SFP B" port (fiber or copper) is active into the MAC switch, but no connection inside the switch is made; in this way, the "SFP B" line is held as the standby line. The "SFP B" line is held in the LINK state for testing and line verification, but does not actively carry user data.

Configuration Method	Description
	When a fault is detected on the active line, all customer traffic is switched to the “SFP B” port. With non-Revertive mode data is not resumed by “SFP A” port.
1+1 SFP Protection Revertive mode	In this mode, the "SFP A" port (fiber or copper) is connected through the switch to the drop ports as the main link. The "SFP B" port (fiber or copper) is active into the MAC switch, but no connection inside the switch is made; in this way, the "SFP B" line is held as the standby line. The "SFP B" line is held in the LINK state for testing and line verification, but does not actively carry user data. When a fault is detected on the active line, all customer traffic is switched to the “SFP B” port. Once the “A” port is no longer in a fault condition, data is resumed on that port.

Management Features

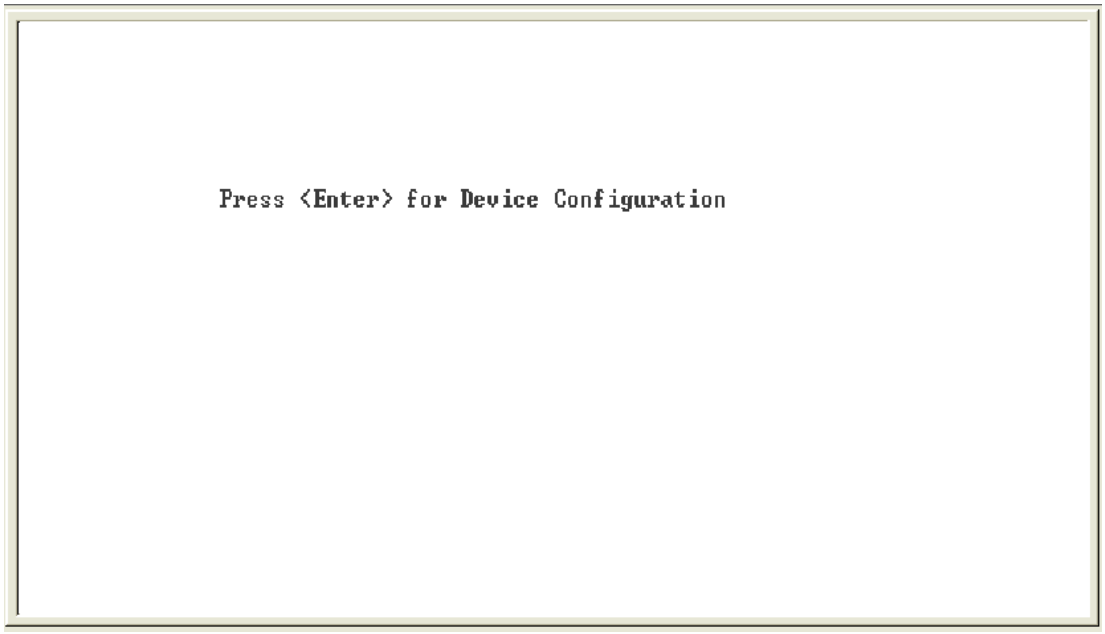
Some configuration of the IE-MultiWay is accomplished using the DIP Switches, and the rest through a console session in the CLI. When all DIP Switches are set to OFF (default setting), the IE-MultiWay acts as a normal 4-port MAC-layer switch with VLAN transparency; firmware upgrades can be performed through iConfig.

The IE-MultiWay includes an RS-232 Mini Jack for the Console port to allow the end user to launch a serial session and access a list of commands. The serial port on the computer/terminal should be set for: 38.4K baud, 8 data bits, 1 stop bit, no parity, no flow control. The F2 key functions as a Delete key on VT-100 emulators.

NOTE
The GUI displays the product for reference; configuration is performed through iConfig and the CLI.

Basic Device Configuration

After running through an initial self test, the screen will display the following message: Press <Enter> for Device Configuration.



Press **Enter** to open the main configuration screen. This screens allows the user to set the IP address and the destination IP address for traps with the community string, read/write access and password as usual.

```
Saved Values. (These values will be active after reboot)
    IP Address      - 10.10.10.10
    Subnet Mask     - 255.255.255.0                DHCP is Not Active
    Default Gateway - 0.0.0.0


Current Values. (These values are in use now)
    IP Address      - 10.10.10.10
    Subnet Mask     - 255.255.255.0
    Default Gateway - 0.0.0.0


Community String: public    Access:  r/w

Press I to enter new saved parameter values. Press P to change Password.
Press T to enter new Trap Destination. Press K to remove All Trap Destinations.
Press C to enter new Community String. Press U to remove All Community Strings.
Press E to End session. Type REBOOT to reboot unit. Press D for DHCP On/Off.
Press SpaceBar for additional commands.
```

This screen contains the following information and options:

Saved and Current Values

Saved values display the changes made during the current session and current values display the values currently in use:

- IP Address (IP address of SNMP agent)
- Subnet Mask (mask to define IP subnet to which agent is connected)
- Default Gateway (default router for IP traffic outside of the subnet)

Command List

I = Enter new **Saved Parameter Values**
P = Change the **Password***
T = Enter new **Trap Destinations**
K = Remove **All Trap Destinations**
C = Create **SNMP Community Strings**
U = Delete All **SNMP Community Strings**
E = **End** the session*
Reboot = Reboot the unit (may result in short data loss)
D = Enable or disable **DHCP**
Space Bar = Opens the device specific configuration options screen.

*Individuals with User-level rights can only view port status and port settings, change their password, end a session, and reboot the unit.

NOTE
*It is necessary to reboot the IE-MultiWay after making any modifications to the Saved Values for the changes to take effect. To reboot, type **Reboot** at the prompt on the Main Configuration screen.*

Assigning IP Information

To modify the Saved Parameter Values (i.e., assign IP address and subnet mask), press **I**. The system prompts for the IP address and subnet mask for the connected device. Press **Enter** after each entry. A default gateway can also be assigned, or press **Enter** to skip. When finished, press Enter, then type **reboot** for changes to take effect. The Current Values can only be saved and acted on after the IE-MultiWay has been successfully rebooted.

Password Protection for Serial Port Connections

Passwords have the following requirements:

- The password must be between 1 and 8 characters long
- The password consists of a combination of any ASCII characters except spaces
- Passwords are case sensitive

Password protection is provided for the serial configuration process by pressing **P** on the main configuration screen. Enter a password, keeping in mind that passwords are case-sensitive and must not exceed eight characters or include spaces, and press **Enter**. This password will be requested whenever logging on. To remove password protection, select **P** and, instead of entering a password, press **Enter**.

Passwords are a way to make the management of the IMC Networks devices secure, but these password lists must be stored and maintained. If a password becomes lost, please contact IMC Networks technical support at 1-800-624-1070 or 1-949-465-3000.

Assigning SNMP Trap Destinations

Traps are sent by the manageable device to a management PC when a certain event takes place. To enter a trap destination, press **T**. When prompted at the Enter a New IP Address prompt, enter the appropriate IP address of the destination device and press Enter. Then, type the name of the community string (that the destination device has been configured to accept) and press **Enter**. Select whether the trap is for SNMP version 1 or 2c and press Enter. This function enables ALL of the device traps. Supported traps include: Link Down, Link Up, and Last Gasp.

Removing Trap Destinations

To remove all trap destinations, press **K**. Press **Y** to continue to confirm or **N** to abort and remove all trap destinations. Press **Enter** to finish.

This function will delete all trap destinations. To selectively delete trap destinations or select the type of trap reported or not reported, use iConfig to configure the device.

Creating Community Strings

Community strings add a level of security to a network. The default community string is named "public" and has read/write access. "Public" should be replaced with custom community strings such as ones created with read-only access (for general use), and another with read/write access (for the administrator).

To create a new community string, go to the main configuration screen and press **C**. Enter the name of the new community (up to 16 characters, no spaces) and press **Enter**. Then type one of the following to assign the community string's access rights:

- R = read-only access
- W = read/write access
- Enter = abort

After entering **R** or **W**, press **Enter**. To finish, press **Enter** and reboot.

Deleting Community Strings

To delete all community strings, perform the following:

Press **U**. The "Are you sure you want to delete all future strings?" prompt is displayed. Press **Y** when prompted to proceed and delete all community strings, **N** to abort. Press **Enter** to finish.

This function will delete ALL community strings. To selectively delete community strings, use iConfig to configure the device.

Ending the Session

Press **E** to end a serial port or Telnet/HyperTerminal session before disconnecting the serial cable. This will stop the continuous stream of data to the serial port.

Rebooting the Unit

To reboot the IE-MultiWay, type **reboot**.

Enabling/Disabling DHCP

To toggle DHCP on the IE-MultiWay between enable and disable, press **D.** Press the Space Bar once to access additional commands.

DHCP Disable (Static IP Addressing)

DHCP is disabled in the default configuration. Initially, modules are assigned a Static default IP Address of 10.10.10.10. Changes to the Static IP Address can be added manually through iConfig or a Console session. The changes will be initiated following reboot of the module.

DHCP Enable (Dynamic IP Addressing)

If a DHCP server is present on the network and DHCP is enabled, the DHCP client will initiate a dialogue with the server during the boot up sequence. The server will then issue an IP address to the management card. Once the new IP address is received, the SNMP Management Module will reboot so that the new IP address will take effect. Refer to About Serial Port Configuration for more information about Enabling/Disabling DHCP.

When there is no DHCP server on the network, use the serial configuration to manually set the IP addresses.

When DHCP is enabled, the IP address (default 10.10.10.10 or user configured) is saved. When DHCP is disabled, the saved IP address will be reinstated and the device will reboot.

DHCP servers give out lease times: devices renew their leases based on the administrator-specified time. If a device cannot renew its lease, and the lease expires, the device will be given the IP address 10.10.10.10 and will reboot.

Commands List (Space Bar)

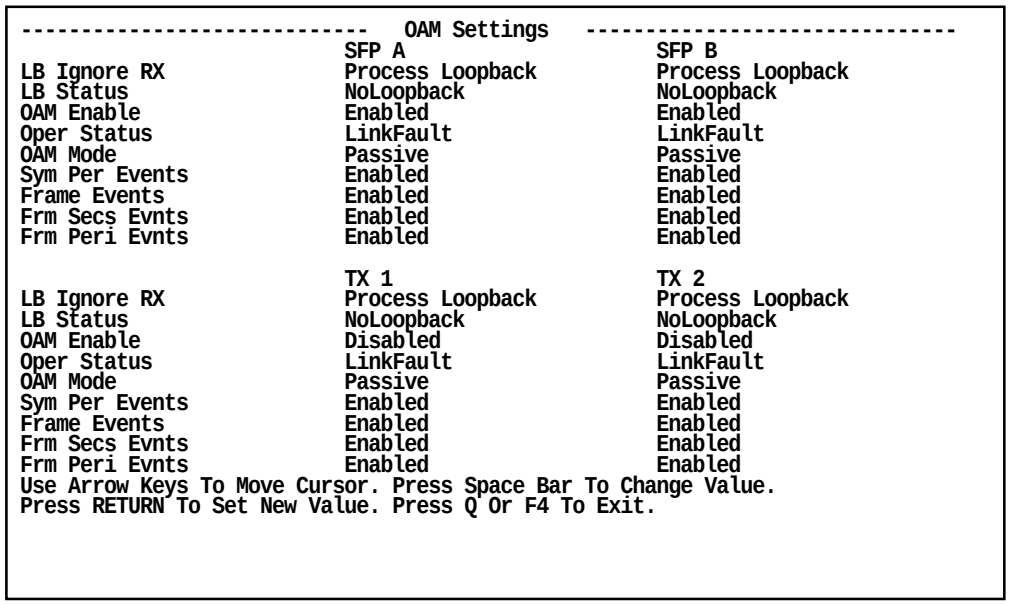
```
Command         Description
--------        -----------
cleandb         Reboot With Clean Database
version         Show Firmware Version
ifstats         Display Port Statistics
rmstats         Display Port RMON Statistics
sysdescr        Change System Descriptions
reboot          Reboot Unit
oam             Display And Change OAM Settings
sfpstats        Display SFP DDMI Info
port            Display Port Status

->
Press RETURN To Go Back To Main Screen.
```

The IE-MultiWay also includes several device-specific options. To access these options, press the **Space Bar** from the Main Configuration screen, type the name of the action to be performed (as shown below) and press **Enter**.

Command	Description
cleandb	Reboots the unit with a clean database. This removes all information from the database and sets the unit to factory defaults.
version	Displays the unit's firmware and hardware version
ifstats	Displays interface statistics.
rmstats	Displays remote monitoring (RMON) statistics on packets received as defined in RFC 2819 for RMON.
sysdescr	Allows the editing of sysName, sysDescr, and Port information
reboot	Allows a soft reboot of the unit after changes are made by the end user
oam	Enable/disable OAM.
sfpstats	Provides information about the wavelength, serial number, output power, BER and other information. Requires an SFP with DDMI.
port	Displays the port status and allows changes to port settings, such as duplex status and speed.

OAM (Operation and Administration Management)

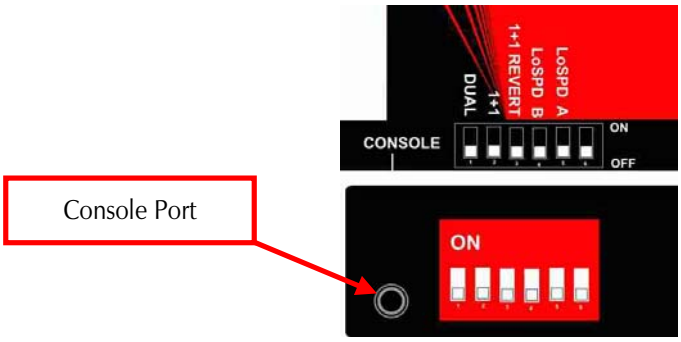


Two modes of operations control the OAM function, Passive and Active. Passive mode is default mode.

OAM Passive is available on the fiber SFP ports and TX ports

- Supports the Passive (PASS) Discovery functions on the SFP ports.
- Supports reporting OAM Flag Events (Link Fault, Critical Event, and Dying Gasp)
- Supports Passive Remote Loopback
- Remote and Local Loopback: in the CLI, enable “LB ignore RX” on any port and set to “Process Loopback”.

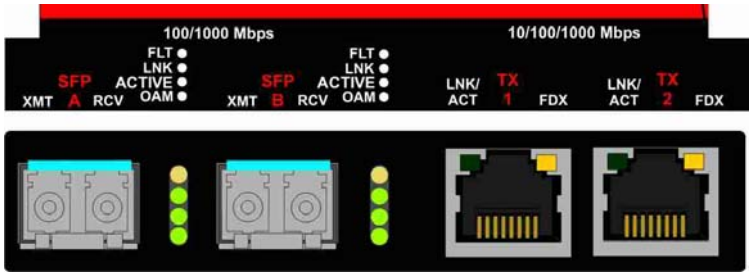
DIP Switch configuration



DIP Switch	Name	Description	Default Setting
1	Dual	Enable dual channel	OFF
2	1+1	Provides 1+1 protection with non-revertive switching	OFF
3	1+1 Revert	Provides 1+1 protection with revertive switching	OFF
4	LoSpd A	Force SFP "A" for low-speed operation	OFF
5	LoSpd B	Force SFP "B" for low-speed operation	OFF
6	Reserved		

LED Operation

Each IE-MultiWay includes SFP and RJ-45 LEDs.



SFP LED functions are as follows:

FLT Glows amber when a fault is detected.

LNK Glows green with a valid optical link.

ACTIVE Glows green when the port is active
OFF when SFP is in standby (does not indicate activity)

OAM Glows green when an active OAM channel is established.

RJ-45 LED functions are as follows:

LNK/ACT Glows green when a link is established on the TX port; blinks green when activity is detected on the TX port.

FDX Glows amber when an FDX link is established on the TX port.
Not lit for HDX.

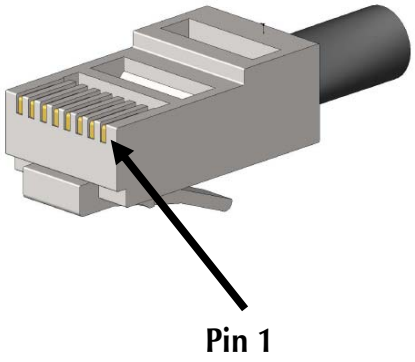
DC Terminal Block Wiring Instructions

The IE-MultiWay can also be powered with the DC terminal block. From a power source, connect to any one positive and any one negative terminal on the IE-MultiWay.

NOTE
When using stranded wire, the leads should be tinned. The DC terminal block is protected against mis-wiring; if mis-wired, the chassis will not function

RJ-45 Data Port Pinout

The following table lists the pin configuration for the RJ-45 Data connector.



Pin	Signal Name 1000M	Signal Direction 10/100M
1	TXD1+	Out*
2	TXD1-	Out*
3	RXD2+	In*
4	D3+	
5	D3-	
6	RXD2-	In*
7	D4+	
8	D4-	

***Note that the MDI/MDIX function will automatically adjust the direction of these signals to match the connected unit when running 10/100Base-T. 1000Base-T will use all 4 pairs in full duplex mode.**

RS-232 Serial Console Port

The following table lists the pin configuration for the RS-232 3-pin Mini Jack mating connector for the console serial port.

The Mini Jack to DB9 connector is available for purchase through IMC Networks (Part number 825-39951).

Pin	DB9-F Pin#	Signal Name	Direction
Tip	2	Transmit	Out of Unit
Ring	3	Receive	In to Unit
Sleeve	5	Return	Return

Specifications

Ethernet Connections

- SFP 1000 Base-X
- SFP 100 Base –FX
- SFP 10/100/1000 Copper (SGMII)
- 10/100/1000 BaseT (Fixed Copper ports)
- Auto Negotiation
- Auto-Cross
- Flow Control
- Up to 10,240 MTU
- Full Line-Rate Forwarding

Power

DC terminal	48 VDC Telco
DC jack	5 VDC
Double-USB Power Cable	Spec 500mA Note that the laptop or PC USB ports must be 2.0 or greater to provide sufficient power to the unit.
AC wall adapter (Franmar)	Input: 100 to 240 ±10% VAC Output: 5 VDC, 2A max.

Operating Temperature

-40°F to +185° F (-40°C to +85°C) DC configuration
+14°F to +122° F (-10°C to +50°C) with Franmar AC wall adapter

Storage Temperature

-67°F to +257°F (-55°C to +125° C)

Humidity

5 to 95% (non-condensing); 0 to 10,000 ft. altitude

Dimensions

0.86″H x 3.66″W x 3.88″D (2.2cm H x 9.3cm W x 9.8cm D)

Current Draw

1.5A @ room temperature with data and copper SFPs
1.1A @ room temperature with fiber SFPs

Standards/Compliance

- IEEE 802.3x Flow Control
- IEEE 802.3i 10Base-T twisted pair
- IEEE 802.3u 100Base-TX twisted pair
- IEEE 802.3u 100Base-FX or SX fiber

NOTE
SFPs are covered by a one-year warranty. *The optional IE-5V DC Power Block is covered by a three-year warranty.*

IMC Networks Technical Support

Tel: (949) 465-3000 or (800) 624-1070 (in the U.S. and Canada);
+32-16-550880 (Europe)

Fax: (949) 465-3020

E-Mail: techsupport@imcnetworks.com

Web: www.imcnetworks.com

Fiber Optic Cleaning Guidelines

Fiber Optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust, which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

1. Use fiber patch cords (or connectors, if you terminate your own fiber) only from a reputable supplier; low-quality components can cause many hard-to-diagnose problems in an installation.
2. Dust caps are installed at IMC Networks to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. Should it be necessary to disconnect the fiber device, reinstall the protective dust caps.
3. Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when reinstalled they do not introduce any contamination to the optics.
4. If you suspect that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to any product, add-in modules or stand alone units, containing electronic components. Always observe the following precautions when installing or handling these kinds of products

1. Do not remove unit from its protective packaging until ready to install.
2. Wear an ESD wrist grounding strap before handling any module or component. If the wrist strap is not available, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.
3. Hold the units by the edges; do not touch the electronic components or gold connectors.
4. After removal, always place the boards on a grounded, static-free surface, ESD pad or in a proper ESD bag. Do not slide the modules or stand alone units over any surface.

WARNING! Integrated circuits and fiber optic components are extremely susceptible to electrostatic discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

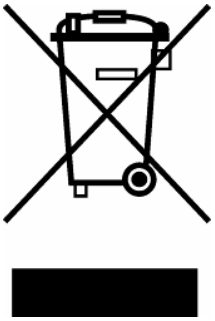
Safety Certifications

UL/CUL: Listed to Safety of Information Technology Equipment, including Electrical Business Equipment.

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (2004/108/EC) and the Council Directive on Electrical Equipment Designed for use within Certain Voltage Limits (2006/95/EC). Certified to Safety of Information Technology Equipment, Including Electrical Business Equipment. For further details, contact IMC Networks.

Class 1 Laser product, Luokan 1 Laserlaite,
Laser Klasse 1, Appareil A'Laser de Classe 1

European Directive 2002/96/EC (WEEE) requires that any equipment that bears this symbol on product or packaging must not be disposed of with unsorted municipal waste. This symbol indicates that the equipment should be disposed of separately from regular household waste. It is the consumer's responsibility to dispose of this and all equipment so marked through designated collection facilities appointed by government or local authorities. Following these steps through proper disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about proper disposal, please contact local authorities, waste disposal services, or the point of purchase for this equipment.



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